

REMARKS

Reconsideration and allowance of this application are respectfully requested in view of the above amendment and the discussion below.

The present invention concerns a radar system which may be used in automobiles which functions with a reduced consumption of power when compared with prior art radar systems while still retaining the ability to perform a radar search without some objects being undetected. According to the present invention, there is a first operating mode and a second operating mode. The second operating mode has an energy consumption less than the first operating mode. A receiver obtains electromagnetic waves reflected from the object and the output signal of the receiver determines the switching between the first and second operating mode as defined by independent claim 1. Independent claim 7 defines a digital signal processing means functioning in two modes and including a judging means for determining whether a receiver signal satisfies predetermined condition in order to determine a change of operating mode between the first and second modes. Independent claim 9 recites that the digital signal processing means provides an operating mode switch signal external from the radar apparatus.

Claims 1-10 have been rejected under 35 USC §112, as anticipated by Richardson et al. (U.S. Patent No. 5,828,333), as indicated at Item 7 on page 3 of the Office Action.

Applicants submit that independent claims 1, 7 and 9 recite structure not shown, disclosed or made obvious by Richardson et al. and that Richardson et al. differs from the claimed invention not only in structure but in purpose.

The reference to Richardson et al. '333 measures range and speed using a two frequency CW method but differs from the present invention in the sense that Richardson et al. minimizes interference with other radar whereas the present invention reduces energy consumption of the radar.

In order to carry out this difference in purpose, it is quite clear that the structure claimed in independent claims 1, 7 and 9 is not shown by Richardson et al. According to the presently claimed invention, the second operating mode has energy consumption less than the first operating mode. The processor of the present invention, as a function of the received signal, switches the operation mode to either the first or second operating modes. As a result, unnecessary wave generation is suppressed when no target exists, thus decreasing the energy requirements.

In contrast, Richardson et al. provides an ordinary operating mode, as well as another operating mode for avoiding wave interference from other radars. The second operating mode of Richardson et al. reduces the amplitude of the transmitting wave by using the power adjusting circuit 125 and the RF attenuator 120 as shown in Figure 1, column 4, lines 56 to 60, and column 2, lines 38-44. The attenuator functions so that the amplitude is decreased due to consumption of a high frequency energy without a resistant element. This functions in the same manner for a RF attenuator having a variable attenuation as indicated in Richardson et al.

Stated differently, although the output radio wave is attenuated in the Richardson et al. second operating mode, the energy consumption of the radar of Richardson et al. is substantially the same as in the first operating mode so that Richardson et al. fails to disclose or suggest the claimed feature concerning "the second operation mode requiring an energy consumption less than an energy consumption of the first operation mode" as defined by claim 1.

Independent claim 7 recites a digital signal processing means for processing an A/D converted digital signal and making a judgment as to whether a received signal satisfies predetermined condition and changing the operation mode of the digital signal processing from the first to the second mode. The power adjust circuit 125 of Richardson et al. includes a summation device 450 which adds the power control signal from a temperature sensor. It is submitted

that the present invention of independent claim 7 concerning the digital signal processing means and its operation is not anticipated by Richardson et al. Likewise, independent claim 9 recites the digital signal processing for processing A/D converted digital signal and functioning in two modes with this digital signal processing inputting an operation mode switching signal from external of the radar apparatus. This feature is not available from Richardson et al. and is not an obvious variation in light of the different purposes of the present invention, i.e., reducing energy consumption of the radar when contrasted with the purpose of Richardson et al., i.e., to minimize interference with other radars.

Therefore, it is submitted that each of independent claims 1, 7 and 9, provides structure not shown or disclosed by Richardson et al.

Claims 2, 9 and 7 have been rejected under 35 USC §112, with respect to the meaning of the term "rate" in the claim. The term "rate" applies to speed or velocity of the object being detected and more particularly the relative speed or velocity. This is stated in the specification at page 1, line 14-15. Accordingly, in order to comply with the requirements of the Examiner, the term "relative velocity" has been substituted for the term "rate" in claims 2, 7 and 9. Therefore, claims 2, 7 and 9 meet the requirements of 35 USC §112.

Newly added claim 11 further limits dependent claim 2 by reciting that the second operation mode is carried out by stopping a part of operation of a

U.S. Appln. Serial No.: 10/785,007
Amendment Dated: May 2, 2006
Reply to Office Action Mailed: November 2, 2005
Attorney Docket No.: 056203.53295US

microprocessor and the A/D converter within the radar apparatus. This is supported by the originally filed specification at page 14, which indicates that in the sleep mode, a portion of the microprocessor continues to operate so that the normal operation mode can be recovered in response to an interrupt signal.

Therefore, in view of the distinguishing features between the claimed invention and the reference, which features are not shown or disclosed by the reference, applicants respectfully request that this application containing claims 1-11, including newly added dependent claim 11 and independent claims 1, 7 and 9, be allowed and be passed to issue.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

U.S. Appln. Serial No.: 10/785,007
Amendment Dated: May 2, 2006
Reply to Office Action Mailed: November 2, 2005
Attorney Docket No.: 056203.53295US

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #056203.53295US).

Respectfully submitted,

May 2, 2006



Vincent J. Sunderdick
Registration No. 29,004

CROWELL & MORING LLP
Intellectual Property Group
P.O. Box 14300
Washington, DC 20044-4300
Telephone No.: (202) 624-2500
Facsimile No.: (202) 628-8844
GRE:VJS:aw

2761839